

ON SOME NEW SPECIES OF EUCALYPTUS.

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(Plates xv.-xix.)

EUCALYPTUS VITREA, sp.nov.

“White Top Messmate.”

(Plate xv.)

A tall tree with a roughish bark similar to *E. amygdalina*, Labill., the extremities of the branches being smooth.

Sucker leaves alternate or opposite, with a short petiole or sessile, ovate-lanceolate, acuminate, lateral veins diverging from below the middle of the midrib, prominent on both sides, intra-marginal vein removed from the edge, not shining; under 6 inches long, $1\frac{1}{2}$ inches broad. Mature leaves narrow-lanceolate, about 6 inches long, and 6 to 9 lines wide, petiole short; *shining on both sides*, a dull green when fresh but drying a light slate colour; lateral veins few and almost parallel to the midrib, two generally commencing at the base of the midrib and running the whole length of the leaf almost parallel to the midrib. Oil glands very numerous.

Peduncles axillary, short, 2-3 lines, bearing generally from 5-8 flowers. Buds from $2\frac{1}{2}$ to 4 lines long, operculum hemispherical, shortly acuminate. Ovary flat-topped. Anthers kidney-shaped, connective prominent.

Fruit hemispherical, about 3 lines in diameter, rim thick, red, slightly convex, shining, pedicel about 1 line long.

Hab.—Crookwell (J. J. Hook), Moss Vale (S. Farrell), mountains north of Marulan (R. H. Cambage), Bungendore (W. Bäuerlen).

Timber.—A hard, close-grained timber, full of shakes and gum veins, and apparently of little economic value. It possesses none of the good qualities of *E. amygdalina*, Labill., which is fissile, soft and easily worked.

Oil.—Leaves obtained from Crookwell, New South Wales, 16th June, 1900. Average yield of oil for three distillations = 1.48 per cent. The crude oil is almost colourless. It contains much phellandrene, over 20 per cent. eucalyptol, and citral is probably present in the higher boiling portions, the lemon odour being very marked and the aldehyde reactions readily obtained. The constituent having an odour of peppermint, present in the oil of *E. coriacea*, appears to be absent in this oil, and it thus approaches more closely the oil of *E. amygdalina*. Less than 2 per cent. distilled below 173° C.; between 173° C. and 183° C. 78 per cent. distilled (corrected).

Specific gravity crude oil at 15° C. = 0.886.

Specific gravity fraction 173-183° C. at 15° C. = 0.8792.

Specific rotation crude oil = $[\alpha]_D - 33.92^\circ$.

Specific rotation first fraction = $[\alpha]_D - 37.76^\circ$.

Eucalyptol in fraction 173-182° C. = 26 per cent. (H. G. Smith).

This tree is known locally as "Silver Top Messmate," "Peppermint," and "Messmate," but in connection with this species it is not proposed to perpetuate the two latter vernacular names, which should be restricted to *E. dives*, Schau., and *E. amygdalina*, Labill., respectively.

"Messmate," *E. amygdalina*, has a somewhat similar bark, but its timber is quite different from this species. It is called "Silver Top" from the glinting of the shining leaves in the sunlight, which causes them to appear silvery. For a similar reason *E. leycopinea*, R.T.B., is called "Silver Top Stringybark."

This tree, like *E. dives*, Schau., *E. radiata*, Sieb., and other species, has probably been confounded with *E. amygdalina*, Labill., when determined on herbarium material alone.

The venation of the leaves resembles that of *E. amygdalina* and *E. coriacea*, but more particularly the latter species. The immature fruits are difficult to distinguish from those of *E. amygdalina*, whilst the mature ones bear a strong likeness to those of *E. coriacea*. The bark is almost identical with that of *E. amygdalina*, but the timber is quite distinct, resembling more closely that of *E. dives*, from which species, however, it differs in the shape and venation of both sucker and mature leaves, fruits and constituents of the oil.

From *E. coriacea* it differs in the nature of its timber, bark, oil and leaves. Summarised, this species has (a) a bark similar to that of *E. amygdalina*; (b) timber similar to that of *E. dives*; (c) leaves and venation similar to those of *E. coriacea*; (d) fruits approaching in form to those of *E. amygdalina*; and (e) sucker leaves differing from those of any of the species above enumerated. It is most closely allied to *E. coriacea* and *E. dives*, but yet very distinct from both.

Its specific name alludes to the glossy surface of the leaves.

EUCALYPTUS DELEGATENSIS, sp.nov.

“White Ash,” “Silver-Topped Mountain Ash.”

(Plate xvi.)

A very tall tree occurring on the top of mountain ranges in the south-east corner of the colony. Bark stringy, reddish, extending well up the trunk.

Sucker leaves large, broadly lanceolate, oblique, venation prominent, spreading, intramarginal vein removed from the edge. Mature leaves comparatively large, often 9 inches long and 2 broad, lanceolate, acuminate; venation prominent, lateral veins spreading, intramarginal vein removed from the edge. Oil glands numerous.

Peduncles axillary, about 6 lines long, slightly compressed, bearing from 6-10 flowers. Buds clavate, 6-7 lines long, calyx

short, merging into a pedicel 3-4 lines long; operculum hemispherical, obtuse. Ovary flat-topped. Anthers kidney-shaped; stamens all fertile.

Fruit pyriform, about 4 lines long and 3 broad, rim thick, truncate or countersunk.

Hab.—Delegate Mountain, N.S.W. (W. Bäuerlen).

Timber.—Pale-coloured, very fissile; used for general indoor purposes in the above locality.

Oil.—Leaves obtained from Delegate Mountain, New South Wales, 16th February, 1899. Average yield of oil for three distillations = 1·76 per cent. The crude oil is a light lemon colour, and is but little coloured, resembling in this and other respects the oil of *E. dives*, *E. radiata*, &c. It consists largely of lævophellandrene, contains no eucalyptol, and eudesmol could not be detected. Eighty per cent. of the oil distilled between 172° and 183° C. (corrected), less than 2 per cent. distilling below 172° C.

Specific gravity of crude oil at 15° C. = 0·8602.

Specific gravity fraction 172-183° C. at 15° C. = 0·8513.

Specific rotation crude oil = $[\alpha]_D - 68\cdot12^\circ$.

Specific rotation fraction 172-183° C. = $[\alpha]_D - 75\cdot76^\circ$.

Kino.—The kino is allied to all those kinos belonging to the group Renantheræ, and differs in no respect from the kino of *E. amygdalina*, *E. Sieberiana*, &c.

It is difficult from herbarium specimens to differentiate this species from *E. Sieberiana*, F.v.M., and *E. obliqua*, L'Hér. The leaves are identical with those of *E. lævopinea*, R.T.B.; but in the fruits and in its economic and chemical products it is quite distinct from that species. The buds are very similar to those of *E. Sieberiana*, F.v.M., but the timber, bark and oil show it not to be that species; and the same may be said of *E. obliqua*.

In botanical sequence it is placed between *E. Sieberiana* and *E. obliqua*. The quite smooth limbs and partially smooth trunk,

as well as quite different young leaves, and its more restricted habitat on more elevated mountain situations, distinguish it from *E. obliqua*.

Mr. W. Bäuerlen, who was the first to bring this Eucalypt to notice, states that—"It is a large tree, up to 200 feet high, and 3-5 feet diam. Bark on trunk persistent, fibrous, not easy to distinguish from that of *E. obliqua*, or that of *E. fastigata*. Limbs, and even sometimes the upper part of the trunk, quite smooth, a character which distinguishes the tree from the two above-named species. Young leaves and fruit resemble those of *E. Sieberiana*, but bark and timber are quite different. The timber is highly spoken of, cut in the sawmills and used for building purposes; much preferred for splitting, for which purpose it is said to equal 'Cut Tail' (*E. fastigata*), from which species it is sufficiently removed by the foliage and quite differently shaped fruit.

"Only known, so far, from the Delegate Mountain, and there restricted to a narrow belt on the higher part of the mountain, at an elevation of from about 4000-4500 feet.

"This is not the 'White Ash,' *E. fraxinoides*, Deane & Maiden, of the Tantawanglo Mountain and Sugar Loaf Mountain, much less the 'Silver Top' from near Nimitybelle; nor is it the 'Mountain Ash' (*E. Sieberiana*), despite the similarity of the fruit, the bark being quite different.

"There is great difficulty in distinguishing the leaves of this species from those of *E. obliqua* and those of *E. Sieberiana*, so that in my opinion it will be the chemical analysis which will have to decide between these species.

"Topographically *E. obliqua* occurs on the lower part of the mountain, reaches some distance up, and is then joined by *E. fastigata*, which species ascending somewhat higher leaves *E. obliqua* behind and forms a broad belt, where it abruptly ceases, and the "White Ash" takes its place, forming a narrow belt as it ascends the mountain; then it also ceases abruptly and leaves the higher part and summit to *E. coriacea*.

“The timber-getters look upon *E. obliqua* and *E. fastigata* as the same species, and call them indiscriminately ‘Stringy Bark’ or ‘Cut Tail.’ They also strip the bark indiscriminately; but they distinguish this ‘White Ash’ well, and its bark is not used for stripping. The timber is lighter in colour than that of ‘Cut Tail,’ from which fact the tree has received its vernacular name, and not on account of the bare branches, nor on account of the leaves; in fact, the leaves are remarkably large and broad.

“I may state that instead of becoming rougher with age, as is the case with the ‘Mountain Ash,’ *E. Sieberiana*, and the ‘White Ash,’ *E. fraxinoides*, from Tantawanglo, the bark of this species becomes less and less furrowed as the trees advance in age.

“*E. Delegatensis*, notwithstanding so much resemblance in leaves, buds and fruit, is not *E. Sieberiana*, and comes nearer to *E. obliqua*; however, the buds and some slight difference in the fruit, but especially the young leaves, sufficiently remove it from that species. The bark is more like that of *E. obliqua*, and quite different from that of *E. Sieberiana*, and has not the slightest resemblance to *E. Smithii*, R.T.B.”

The chemical constituents are quite distinct from those of the above-named species (R.T.B.).

EUCALYPTUS INTERTEXTA, sp.nov.

“Spotted Gum,” “Gum,” “Coolabah.”

(Plate xvii.)

A large tree, up to 80 feet high, and 3 feet or more in diameter. Bark smooth nearly to the ground; butt-bark hard and persistent, extending a few feet up the trunk; the smooth bark has patches or spots, and varies much in colour, from brownish or all shades of a lighter grey, to sometimes quite chalky white. Young or sucker leaves similar in shape to mature ones, but at times somewhat broader. Mature leaves lanceolate-acuminate, mostly under 6 inches long, of a pale yellowish, or sometimes bluish, colour on

both surfaces, not shining; lateral veins spreading, but not prominent, and almost quite hidden; intramarginal vein close to the edge. Buds on slender pedicels from 4-6 lines long. Flowers numerous, mostly in a terminal panicle. Calyx small, pyriform. Operculum hemispherical or conical, sometimes shortly acuminate. Ovary flat-topped. Anthers all fertile, cells opening by terminal pores.

Fruit variable in shape, sometimes cylindrical, with the thin rim incurved, whilst at other times pilular in form with a constriction below the rim, 2-3 lines long as well as broad.

Hab.—Dubbo to the Darling River ("Gum"; W. Bäuerlen); Nymagee, Condobolin ("Coolabah"); Mt. Hope ("Yellow Jacket" and "Gum"); Cobar ("Coolabah Gum"); Drysdale ("Coolabah"); Bodabah, 30 miles E. of Nymagee, one of the most easterly localities for this species. For these localities I am indebted to Mr. R. H. Cambage, who also informs me that the difference between "Yellow Jacket" and "Gum" is, that when rough bark goes far up the tree and gives it a yellowish appearance it is called "Yellow Jacket."

Timber.—Timber very hard and red in colour, and very interlocked, in fact so much so that it is stated to be almost impossible to split; and though having a good repute for durability, it is very little used owing to the difficulty in splitting. It should be a good timber for railway sleepers. At Eremeran Station, 30 miles south of Nymagee, and at Double Peak, Mount Hope, the timber is used for making charcoal (R. H. Cambage).

Oil.—Oil from leaves collected at Nyngan, New South Wales, December 7th, 1899:—The crude oil is brownish-orange in colour, phellandrene is not present, and no eudesmol was detected at this time. The oil contains a large quantity of dextropinene proved by its characteristic reactions. Between 165° and 170° C.,* 40 per cent. distilled, while below 185° C. only 84 per cent. had distilled. The oil does not meet the requirements we recommend to be demanded for a good Eucalyptus oil.

* Temperatures corrected to nearest whole degree.

Specific gravity crude oil at 15° C. = 0.9076.

Specific gravity fraction 165-185° C at 15° C. = 0.9016.

Specific rotation crude oil = $[a]_D + 11.8^\circ$.

Specific rotation fraction 165-185° C = $[a]_D + 13.6^\circ$.

Eucalyptol fraction 165-185° C. = 42 per cent.

A consignment of leaves was sent from Girilambone, 16th March, 1900, to test the constancy of the species. The oil differs from that obtained at Nyngan only in the ratio to be expected in Eucalyptus oils of the same species, and they may be considered identical oils.

Specific gravity crude oil at 15° C. = 0.9078.

Specific rotation crude oil = $[a]_D + 10.7^\circ$.

Eucalyptol crude oil = 37.2 per cent.

The yield of oil appears to vary in these trees, but the greatest amount obtained was 0.64 per cent. The deficiency of yield and the inferior quality of the oil make this species of little use for oil distillation (H. G. Smith).

Kino.—The kino is ruby-coloured, transparent in thin pieces, somewhat tough and not easily powdered. It is exceedingly soluble in cold water to a clear ruby-coloured solution. On addition of alcohol to the aqueous solution a precipitate is formed as in the kinos of the ironbarks. The kino is but slightly soluble in alcohol even on boiling. Ferric chloride in a very dilute aqueous solution gives a purplish-brown colouration. This is the first instance of a tree of this character giving a kino containing gum. The ironbarks, and *E. saligna*, *E. resinifera*, *E. patentinervis* and all Eucalypts of this group give kinos containing gum (H. G. Smith).

Another species, *E. largiflorens*, F.v.M., which occurs in the same districts and in herbarium material approaches it closely, is also known by the vernacular name of "Coolabah," but in the field there can be no doubt as to these being distinct species.

E. largiflorens is a "Box-tree," with the usual box bark, and characteristic box timber; but this species has a smooth bark and reddish timber. The two trees are readily distinguished by the settlers.

This species differs from *E. largiflorens* (1) in the inflorescence being mostly in terminal panicles; (2) the shape and venation of the leaves, *i.e.*, the intramarginal veins being only slightly removed from the edge, and the lateral veins being less prominent; (3) the shape and size of the fruits; (4) timber; (5) oil; and (6) bark.

The bark and timber are in colour and texture so different that they alone distinguish it from *E. largiflorens*.

The name "Coolabah" attached to this and a few other species is evidently a mistake, since the true "Coolabah" is an *Angophora* (*A. melanoxylon*, R.T.B.), which occurs at Coolabah, the town of that name on the western railway line. This Eucalypt is at Coolabah also, where it is known as "Gum," and not "Coolabah."

The meaning of the aboriginal name "Coolabah"—a gnarled, knotted tree—applies eminently more to the *Angophora* than to *E. largiflorens* or this species (W. B.).

By the cortical classification of Eucalypts, it belongs to the Gums or smooth-barked Eucalypts; and dividing these into pale- and red-coloured timbers it falls into the latter division. The fruits are quite distinct from those of any described species. The kino and timber connect it with the Ironbarks, but not the bark, which is entirely different.

The similarity of bark and timber, and the shape and venation of the leaf lead me to place it in sequence next to *E. Dawsoni*, R.T.B., but the fruits and constituents of the oil differentiate it from "Slaty Gum," *E. Dawsoni*, and from *E. polyanthema*, Schau., although in some features it resembles this latter species, especially the anthers.

The specific name has reference to the close, interlocked timber.

EUCALYPTUS MORRISII, sp.nov.

"Grey Mallee."

(Plate xviii.)

A mallee of rather dense growth, or somewhat spreading, usually about 15 feet high or somewhat higher; stems 2-3 inches in diameter; rarely growing to tree-size, about 25 or 30 feet high, and 6 to 12 inches in diameter. Stems mostly hollow. Branchlets often flattened or quadrangular. Bark grey, somewhat fibrous, or on very old trees even furrowed, approaching that of an "Ironbark."

Young leaves petiolate, generally lanceolate in form, sometimes narrower and sometimes broader than the mature ones; opposite or with a tendency to become so. Mature leaves lanceolate-acuminate, on petioles of about 1 inch long, occasionally falcate; about 6 inches long and up to 1 inch wide; not shining, venation spreading, very prominent on both sides, intramarginal vein removed from the edge. Oil glands numerous.

Peduncles axillary, not numerous, flattened and twisted, short, under 6 lines, mostly 3-4 lines long, bearing 3 to 7 shortly pedicellate or sessile buds (mostly in threes). Calyx-tube hemispherical, 3 lines in diameter. Operculum obtuse, conical, 3 lines long. Ovary domed. Anthers parallel; connective not prominent.

Fruits hemispherical, rim pyramidal and sometimes twice the length of the calyx, valves well exerted, 3 to 4 lines in diameter, shining.

Hab.—Near Girilambone, on stony or rocky hills, thence on hills across country to Cobar; also near Coolabah, where it occurs on more or less level and less stony ground (W. Bäuerlen).

This species is a Mallee of the northern interior of this colony, where it is found associated with the "Green Mallee" and at times with *E. oleosa*. The bark is sometimes persistent right out to the branches, whilst on some trees it is smooth nearly half-way down. The persistent bark is rougher and more furrowed in the larger trees, making a slight approach to that of the Ironbarks.

It attains not its greatest height, but certainly its greatest diameter, on the highest hills amongst the roughest and rockiest parts (W. Bäuerlen).

Perhaps the most remarkable specific character about it is the rim of the fruits. The word "domed" hardly expresses correctly this feature, for merging into the valves at the top it forms as it were a truncate cone resting on the hemispherical calyx base. This conformation of the rim is noticeable as soon as the stamens begin to fall off, and from this stage, until and after its full development, it gives the appearance to the fruit of a pathological affection or a monstrosity. The shape of the fruits, however, is remarkably constant throughout the extensive range of the species. It is, so to speak, the rim of *E. tereticornis*, Sm., only very much more emphasised.

This Eucalypt differs, however, from that species in the venation and texture of its leaves, shape of operculum, chemical constituents of its oil, as well as in the timber and bark.

The expanded valves are similar to those of *E. viminalis*, but this is its only connecting link with that species.

The buds, especially the operculum, resemble those of *E. santalifolia*, from which species, however, the venation of leaves, and mature fruits differentiate it.

In botanical sequence it is placed next to *E. tereticornis*, Sm.

It is a remarkably constant and well-defined species throughout the area of its distribution.

It is named after R. N. Morris, LL.D., the present Superintendent of Technical Education in New South Wales, in acknowledgment of his co-operation in our work on the economics of the genus Eucalyptus.

Timber.—A hard, close-grained, interlocked, brownish-coloured, durable timber, quite distinct from that of *E. viminalis*, Labill., and *E. tereticornis*, Sm., its allies.

Oil.—Leaves sent from Girilambone, New South Wales, 15th January, 1900. Average yield of oil from three distillations, 1.69 per cent. The crude oil is but little coloured, and has an odour

of aldehydes like all good oils of this class. When rectified by distillation the oil is almost colourless, being slightly tinged yellow, also resembling oils of this class. Phellandrene is of course absent. Eudesmol was not detected at this time. There are practically but little constituents boiling at a high temperature, as 95 per cent. distilled below 185° C., consequently the rectified oil is of low specific gravity, and although containing just upon 60 per cent. of eucalyptol, yet this sample would not pass the test of specific gravity as fixed by the Pharmacopœia, as the specific gravity of the crude oil is only 0.9097 at 15° C. This is an excellent illustration of the unsatisfactory nature of this standard of specific gravity of 0.91 as fixed by the Pharmacopœia; this oil is one of the best we have distilled, yet because it is deficient in high boiling constituents, which bodies may be considered objectionable both from a medicinal and commercial point of view, it is penalised or practically condemned because it is too good. It has been proved during this research over and over again that a Eucalyptus oil must not be condemned if its specific gravity is below 0.91 at 15° C. It is again suggested that the standard of minimum specific gravity for Eucalyptus oil be reduced to 0.905 at 15° C.

This oil consists principally of dextropinene and eucalyptol. The oil commenced to distil at 166° C.,* (neglecting the water and aldehydic bodies that came over below this temperature) and between this and 183° C. 94 per cent. distilled. This rectified oil is excellent.

Specific gravity of crude oil at 15° C. = 0.9097.

Specific gravity of fraction 166-183° C. at 15° C. = 0.9095.

Specific rotation crude oil = $[\alpha]_D + 6.7^\circ$.

Specific rotation large fraction = $[\alpha]_D + 7.2^\circ$.

Eucalyptol, crude oil = 57.5 per cent.

Eucalyptol, fraction 166-183° C. = 59.5 per cent.

Another consignment of leaves was sent from the neighbourhood of Girilambone, but obtained some miles from the locality

* These temperatures are corrected to the nearest whole degree.

of the first consignment; these leaves were obtained so that the constancy of the species might be tested. The oil is the same, only a little richer in eucalyptol; it varies only in the percentage amount of its constituents and in its physical properties in the ratio usually experienced in Eucalyptus oils of the same species; this slight alteration may be governed, perhaps, by situation and soil.

Average yield of oil from three distillations = 1.613 per cent.

Specific gravity crude oil at 15° C. = 0.916.

Specific rotation crude oil = $[\alpha]_D + 4.1^\circ$.

Eucalyptol, crude oil = 65 per cent.

This species of Eucalyptus may thus be considered to be an excellent one for distillation, as the yield of oil is large. The oil is excellent; there is a comparative absence of high boiling constituents, consequently on rectification little would be lost. The species is obtainable in any quantity. We have pleasure in bringing this species under the notice of those interested in the distillation of Eucalyptus oil. The results obtained are those that would maintain commercially the leaves and terminal branches being collected and used in the same way (Henry G. Smith).

It gives a plentiful supply of leaves, especially as the clusters would not be destroyed and would always grow up again (W. Bäuerlen).

Kino.—The kino is not plentiful. It is friable, dissolves in boiling water, but becomes turbid on cooling, the turbidity being caused principally by eudesmin, but aromadendrin is also present in small quantity; a very dilute aqueous solution gives with ferric chloride a green colouration (Henry G. Smith).

Mr. W. Bäuerlen, who was the first to collect this Eucalypt, states:—“This species, also a Mallee, grows in the same way as, and associated with Green Mallee, *E. viridis*, R.T.B.; but the leaves are so different in colour, &c., as to distinguish it at once. The bark is much the same, but persistent often right out to the branches;

at other times smooth nearly half-way down. The persistent bark is rougher and more furrowed, in the larger trees making a slight approach to the Ironbarks. In the cross-cut it is red or brown, quite different from *E. viridis*, R.T.B., and the buds, flowers, and fruit are totally different. I cannot make it agree with any of the *Parallelantheræ*, to which section it appears to belong, yet from its peculiar highly domed fruit one would think it might be easily placed if it is a known species. It grows on dry stony hills, extending somewhat more to the foot of the hills. It gives a plentiful supply of leaves, especially as the clusters would not be destroyed and would always grow up again. The umbels are 3-7-flowered, but there appears to be a tendency to 3-flowered umbels. This Mallee is also called "Black Mallee," as well as "Cabbage Mallee," the latter said to refer to the soft wood.

EUCALYPTUS VIRIDIS, sp. nov.

"Green Mallee," "Red Mallee," "Brown Mallee."

(Plate xix.)

E. gracilis, F.v.M., *Eucalyptographia*, Dec. iii. (*partim*).

A Mallee of dense growth, the stems usually 2-3 inches in diameter, though occasionally measuring 20 feet in height, but rarely growing into tree-size. Bark smooth, or only rough at the base of the larger trees.

Sucker leaves constantly much narrower than normal leaves. Leaves erect, narrow-lanceolate to almost linear, under 6 inches long, mostly 2-4, obtuse or acute; petiole short; colour rich green, but lustreless on both sides; venation obscured, lateral veins spreading, intramarginal vein not far removed from the edge.

Flowers 7-10, on axillary peduncles. Buds 4 to 6 lines long. Calyx under 2 lines in diameter, pyriform, operculum hemispherical, very shortly acuminate.

Ovary flat-topped Stamens *all fertile*. Anthers adnate to and circumventing a very pronounced connective which is supported at the base by the thickened end of the filament, opening by lateral pores.

Fruits pilular; rim thin, contracted, about 2·3 lines in diameter; on a pedicel of from 1 to 3 lines long.

Hab.—On the hills near Girilambone, N.S.W., thence across country to Cobar; also seven miles out from Coolabah on the Wilga Downs Road (W. Bäuerlen).

Timber.—A hard, close-grained, interlocked, yellowish-coloured timber. Being a Mallee, it is only rarely found in tree-form, when it has a tendency to pipe.

Oil.—Leaves obtained from Girilambone, New South Wales, 16th January, 1900.

Average yield of oil=1·06 per cent.

The crude oil is of a light orange-brown colour, and has an odour indicating the presence of cuminic aldehyde; no eudesmol was detected. Phellandrene is not present. Eucalyptol was present, but the oil contains less than 10 per cent. of that constituent; lævopinene was also present. Cuminic aldehyde was determined in the higher boiling portion of the oil.

The oil commenced to distil at 167° C.,* between 167° and 172° C. 32 per cent. distilled, mostly lævopinene; below 183° C. 80 per cent. had distilled, and 95 per cent. was obtained below 255° C.

Specific gravity crude oil at 15° C. = 0·9006.

Specific gravity fraction 167-183° C. at 15° C. = 0·8882.

Specific rotation crude oil = $[\alpha]_D - 8\cdot90$.

Specific rotation fraction 167-183° C. = $[\alpha]_D - 8\cdot2^\circ$.

This oil at present has no commercial value (H. G. Smith).

Kino.—Friable; when its aqueous solution is extracted with ether it is found that eudesmin exists alone, aromadendrin being entirely absent. A very dilute aqueous solution gives a green colouration with one drop of ferric chloride (H. G. Smith).

This species, along with another, is figured on the same plate by Baron von Mueller in his *Eucalyptographia* (Dec. iii.) under the name of *E. gracilis*, F.v.M. As by a natural classification it

* These temperatures are corrected to the nearest whole degree.

can be shown that two species have been included under one name, I propose as in a former paper (Proc. Linn. Soc. N.S.W. June, 1898) to give this species specific rank, leaving Mueller's name of *E. gracilis* to apply to the Victorian and South Australian Mallee. Almost all the specimens in the National Herbarium, Melbourne, are referable to it, whilst only a few specimens to Green Mallee, *E. viridis*. I endeavoured to restore it under the name of *E. fruticorum*, but that species is in such inextricable confusion that I think science would be better served if it were given specific rank under the name of *E. viridis*.

The anthers, stamens, section of buds and fruiting twig in the lower left side of the plate (*loc. cit.*) illustrate the Victorian Mallee.

The stamens of the New South Wales Mallee are all fertile, whilst in the southern species the outer ones are sterile. The anthers of the southern species are attached by the connective to the stamens at the back by an attenuated point of the filament, and the cells open by terminal pores. The fruit of the southern species conforms to Bentham's description (B.Fl. iii. p. 211) and and also to Mueller's (Eucalyptographia, Dec. iii.), and is figured by the Baron in the lower left hand corner of his plate.

The anthers and fruits of the Green Mallee, *E. viridis*, are, as already stated, quite different from the above.

Again, Bentham (B.Fl. iii. p. 211) states, under *E. gracilis*: "Stamens . . . outer ones anantherous, . . . anthers small, globular, cells distinct, opening in circular or oblong pores." This description applies to the southern species but not to this one. The oils of the two are also quite different. The shape and venation of the leaves and the fruits show some affinities to *E. stricta* of the Blue Mountains, but the anthers remove it from that species.

Tentatively it is placed with *E. stricta* of the Blue Mountains.

The field observations of Mr. W. Bäuerlen are very valuable in this connection. He states "that the tree is locally called also 'Red Mallee' and 'Brown Mallee,' both names referring to the colour of the surface of the bark. These features are,

however, by no means constant, as the bark is mostly of an ashen-grey colour, in fact, is red or brown, chiefly for some time only after decortication, when the colours are indeed very striking."

"The name 'Green Mallee' refers to the vivid lustreless green of the leaves, so different from other Eucalypts; where this species occurs on and around hills it imparts quite a feature to the landscape, especially as the individual trees grow densely massed together. This characteristic is constant, and is the very one by which the species is at once most readily distinguished in the field."

"The maximum dimensions, as far as seen, are 40 feet in height and 1 foot in diameter. The trunk is almost always hollow, leaving only a few inches of solid wood. Branches, twigs and leaves have rather a stiff upright appearance. The bark is very curious on account of a rich yellow tinge right through the texture, not merely yellow in the inner layer as in some of the Stringybarks. This species must be reckoned amongst the smooth-barked Eucalypts, though a roughish persistent bark runs up sometimes to the height of 6 feet or so."

"It grows generally around the foot of rocky or stony hills in gravelly not purely sandy soils, sometimes found growing densely over patches several miles in extent."

EXPLANATION OF PLATES.

Plate xv.—*E. vitrea*, R.T.B.

- Fig. 1.—Sucker leaves.
- Fig. 2.—Twig with buds, mature leaves and single fruit.
- Fig. 3.—Single fruit with narrow convex rim.
- Fig. 4.—Fruit with countersunk rim.
- Fig. 5.—Anthers (enlarged).

Plate xvi.—*E. Delegatensis*, R.T.B.

- Fig. 1.—Sucker leaf.
- Fig. 2.—Buds and mature leaves.
- Fig. 3.—Fruits with truncate rims.
- Fig. 4.—Fruit with countersunk rim.
- Fig. 5.—Anthers (enlarged).

Plate xvii.—*E. intertexta*, R.T.B.

- Fig. 1.—Young leaves.
Fig. 2.—Twig with buds,
Fig. 3.—Clusters of fruits.

Plate xviii.—*E. Morrisii*, R.T.B.

- Fig. 1.—Twig showing buds and flowers.
Fig. 2.—Twig with early fruit.
Fig. 3.—Section of bud (enlarged).
Fig. 4.—Anthers (enlarged).
Fig. 5.—Cluster of fruits.
Fig. 6.—Top view of fruits.

Plate xix.—*E. viridis*, R.T.B.

- Fig. 1.—Flowering twigs.
Fig. 2.—Umbel of buds with acute operculum.
Fig. 3.—Anther (enlarged).
Fig. 4.—Varieties of fruits.
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